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This is the author's version of a work that was submitted/accepted for publication in the following source:

[Poologanathan, Keerthan & Mahendran, Mahen](#)
(2016)

Experimental study on web crippling strength of hollow flange channels under end-one-flange and interior-one-flange load cases.
Advances in Structural Engineering, 19(6), pp. 966-981.

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<https://doi.org/10.1177/1369433216630462>

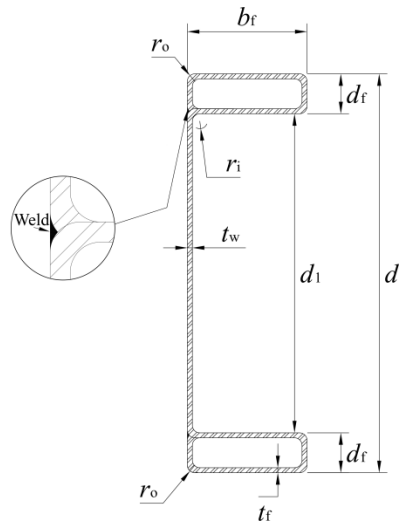
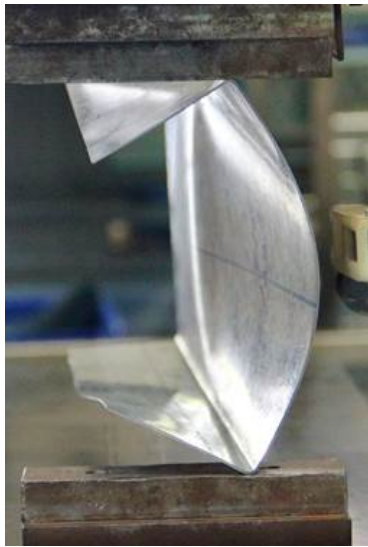
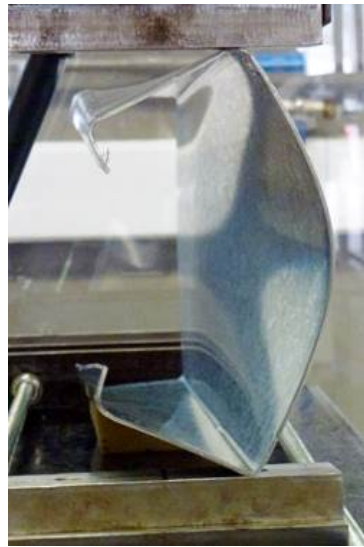


Figure 1: Hollow Flange Channel Sections (OATM, 2008)



(a) Unlipped Channel



(b) Lipped Channel

Figure 2: Web Crippling Failures of Conventional Cold-Formed Steel Sections



Figure 3: Web Crippling Failures of LSBs

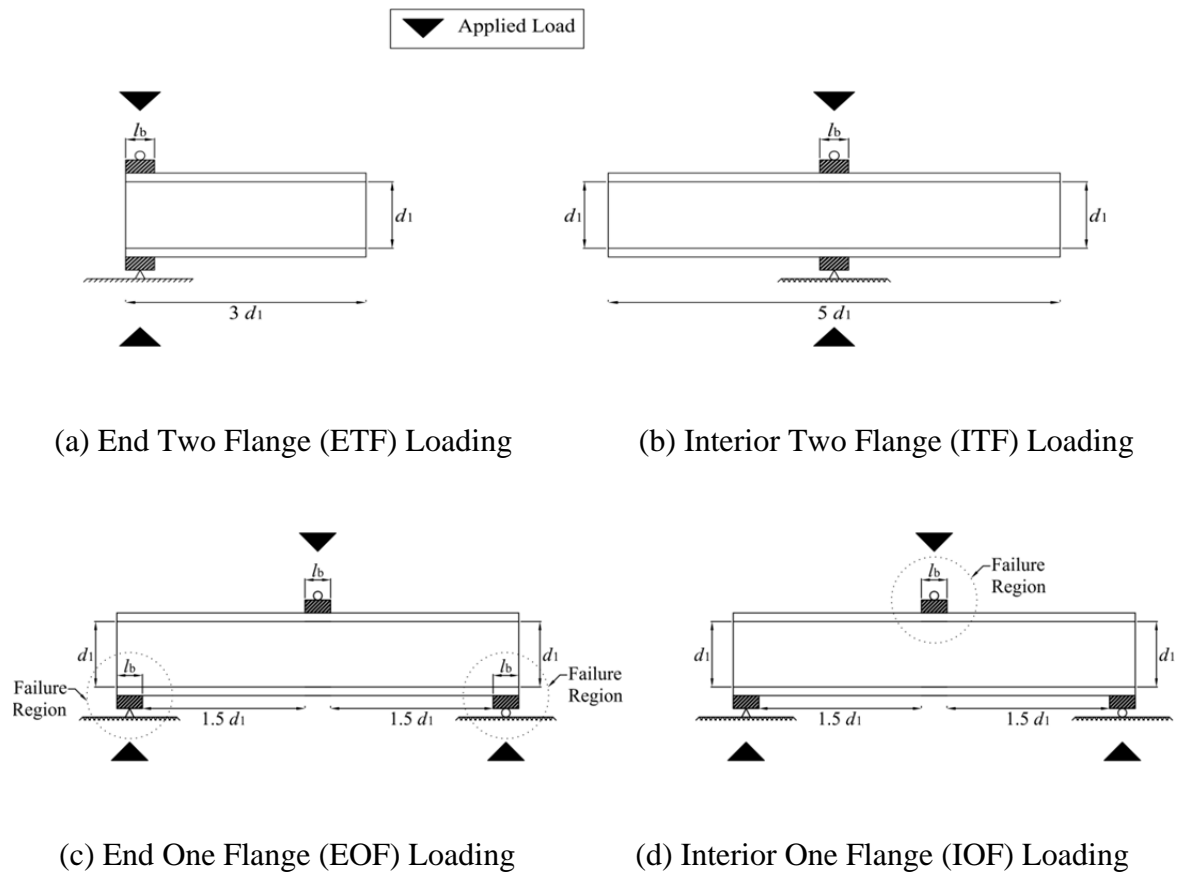
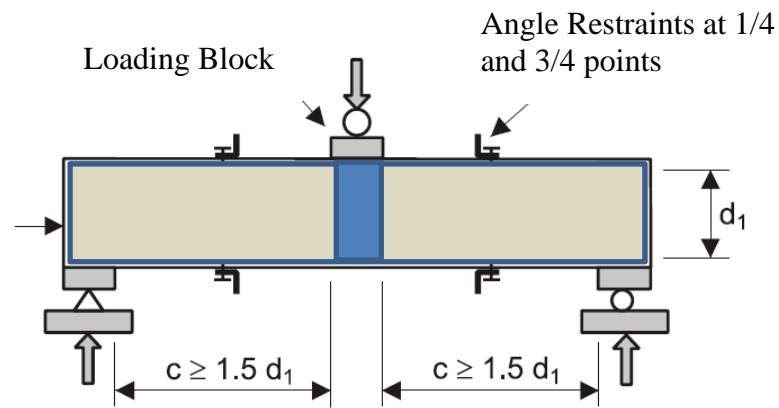
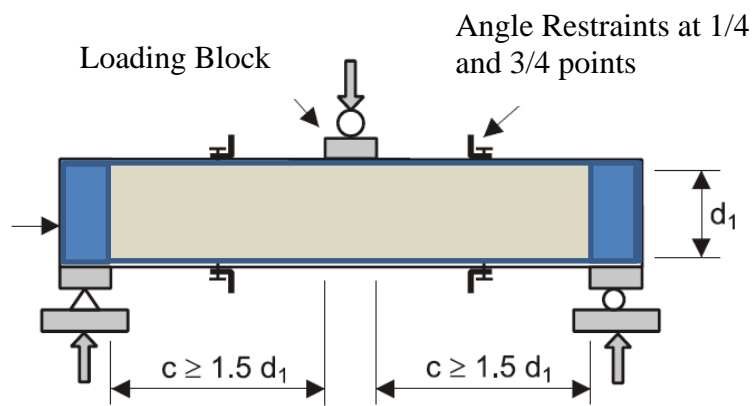


Figure 4: Loading Conditions for Web Crippling Tests (AISI, 2008)

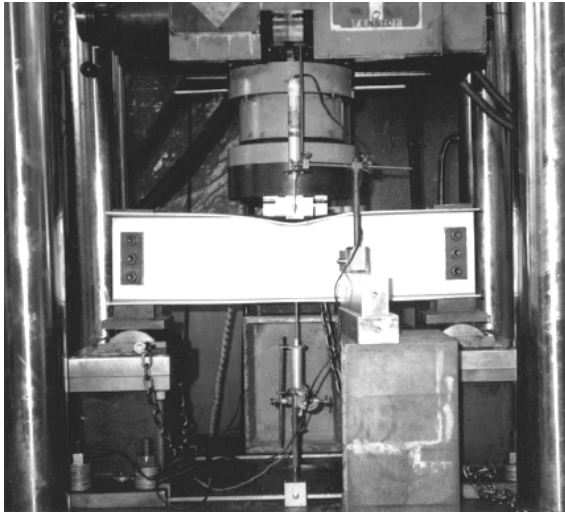


(a) EOF Load Case

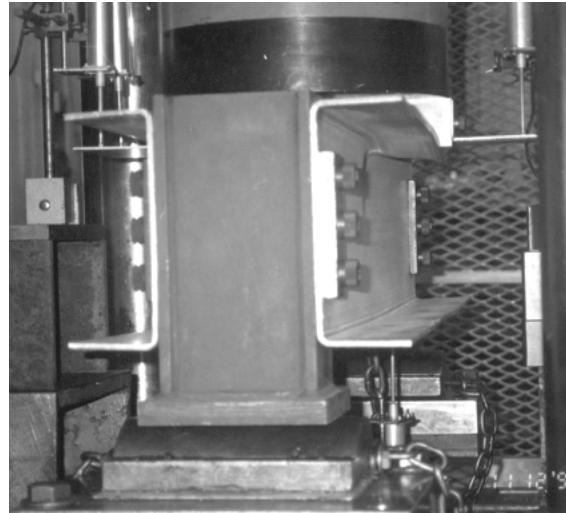


(b) IOF Load Case

Figure 5: AISI S909 Test Method (AISI, 2008)

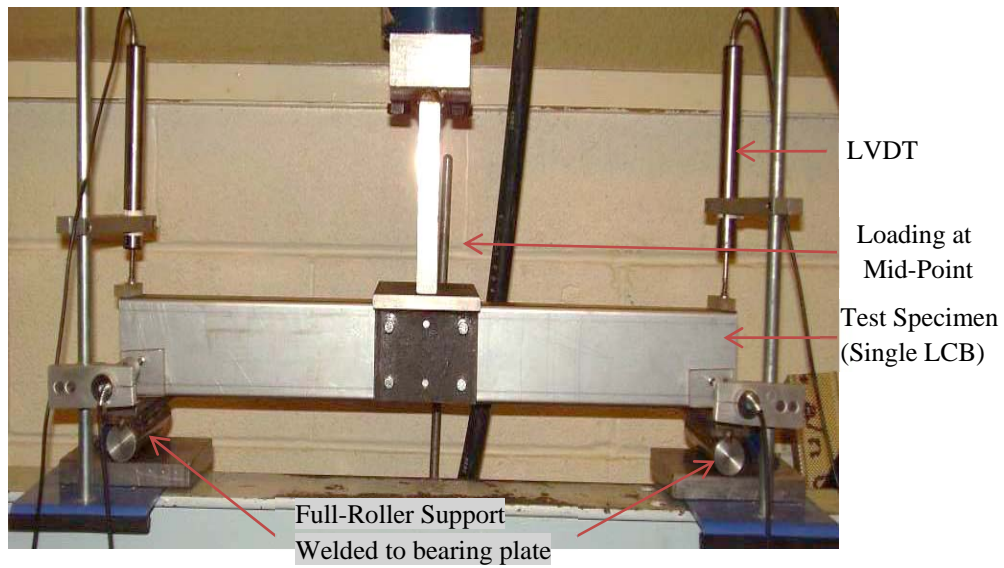


(a) Front view

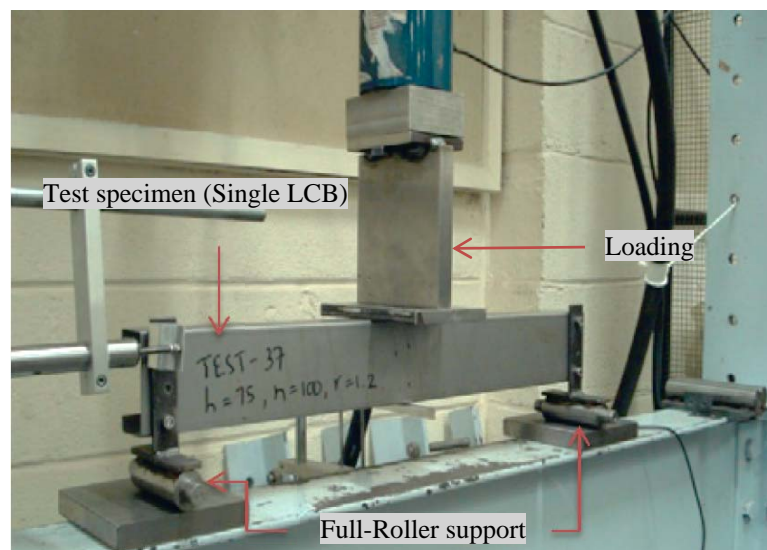


(b) End view

Figure 6: Test Set-up for IOF Loading Condition (Young and Hancock, 2001)

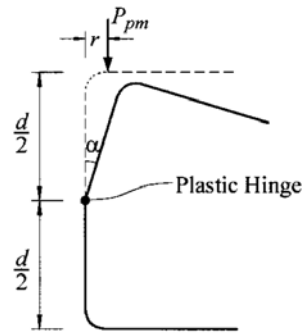


(a) EOF Load Case

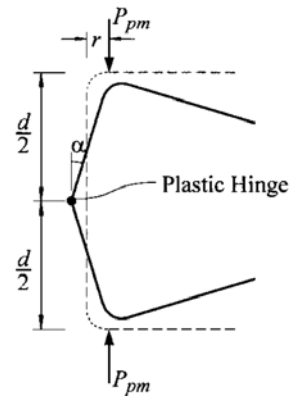


(b) IOF Load Case

Figure 7: Test Set-up for EOF and IOF Load Cases (Macdonald et al., 2011)

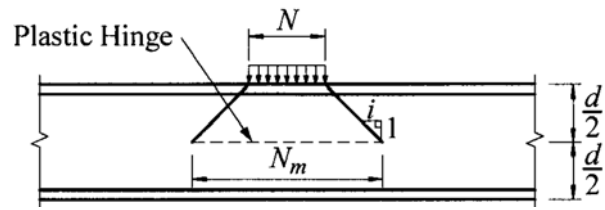


(a) One flange loading

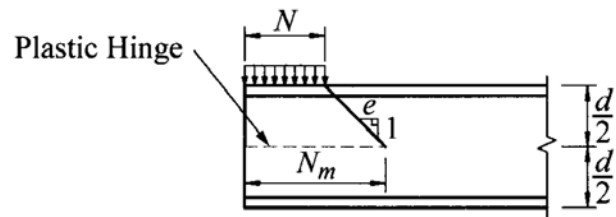


(b) Two flange loading

Figure 8: Mechanism Model Proposed by Young and Hancock (2001)

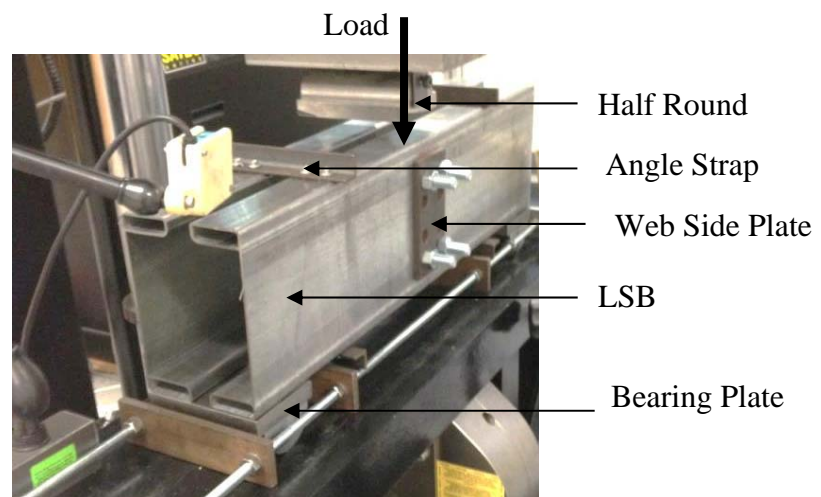


(a) Interior loading

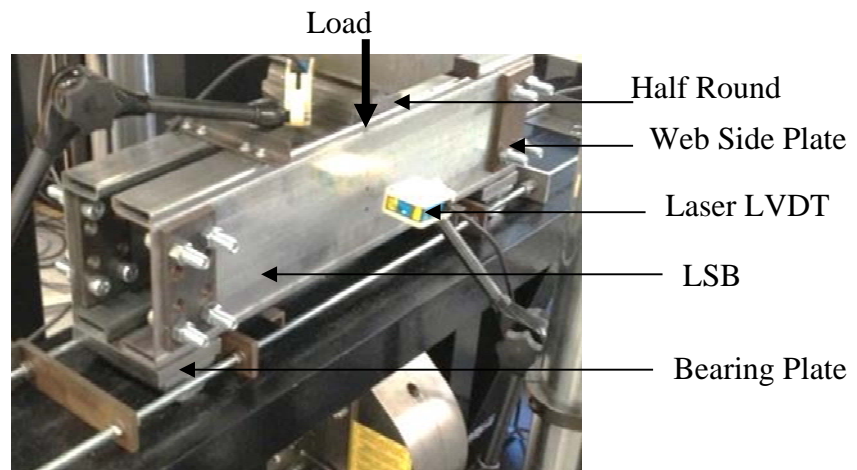


(b) End loading

Figure 9: Plastic Hinge Position and Mechanism Length, (N_m) Assumed by Young and Hancock (2001)

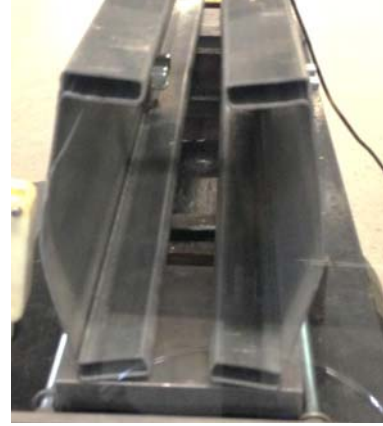


(a) EOF Load Case



(b) IOF Load Case

Figure 10: Experimental Set-up

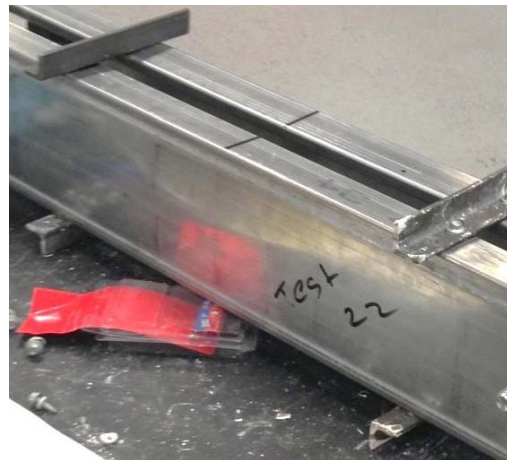


(b) Bearing Length = 50 mm (b) Bearing Length = 100 mm (c) Bearing Length = 150 mm

Figure 11: Web Crippling Failure Modes of 200x45x1.6 LSBs under EOF Load Case



(a) Bearing Length = 100 mm



(b) Bearing Length = 150 mm

Figure 12: Web Crippling Failure Modes of 150x45x2.0 LSBs under IOF Load Case

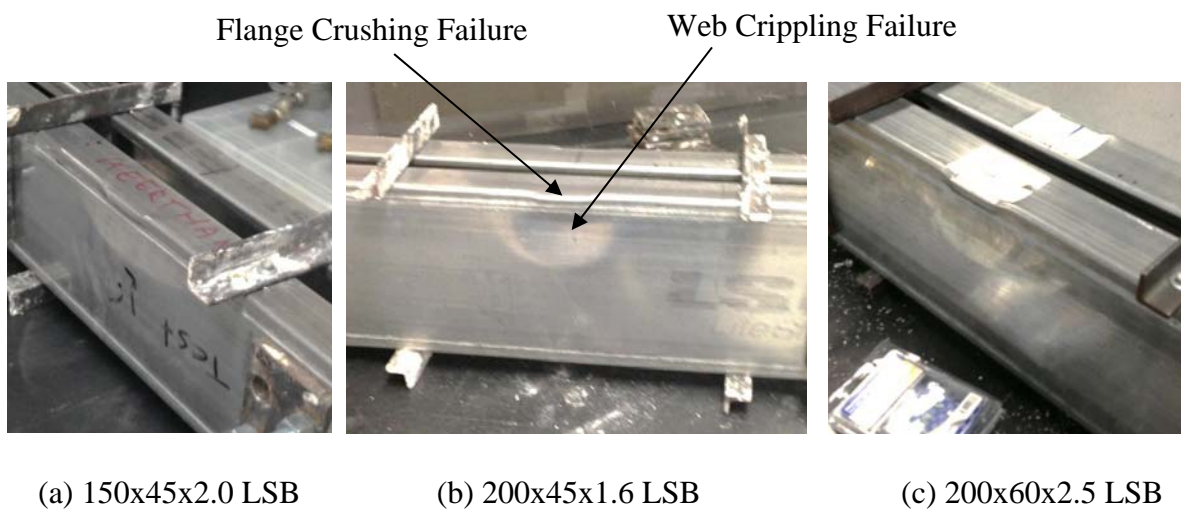
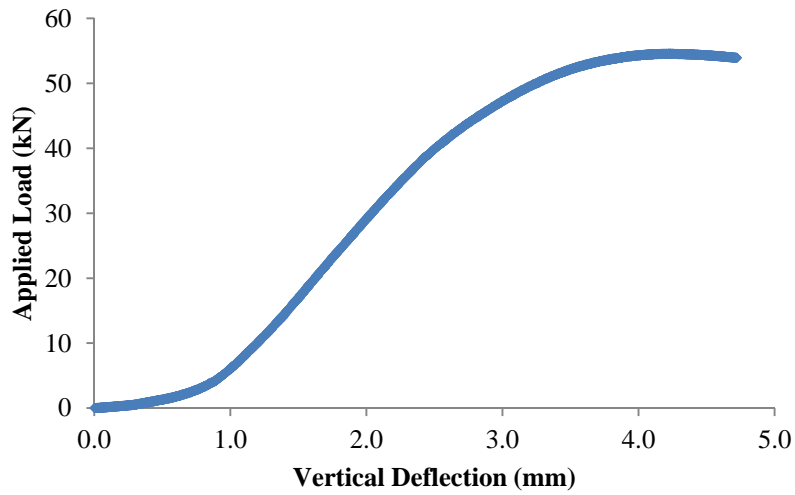
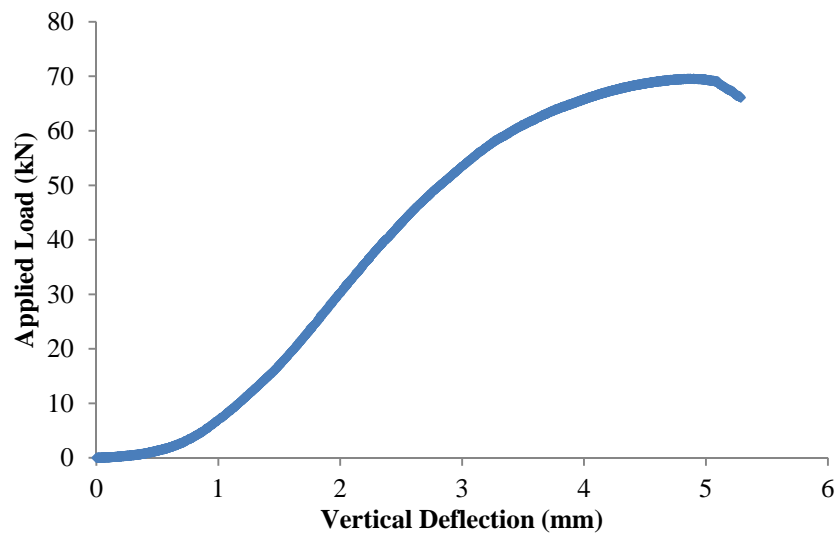


Figure 13: Flange Crushing and Web Crippling of LSBs (Bearing Length =50 mm)



(a) EOF Load Case (Test Specimen 7)



(b) IOF Load Case (Test Specimen 19)

Figure 14: Plot of Applied Load versus Deflections for 200x45x1.6 LSB with Bearing Length = 100 mm

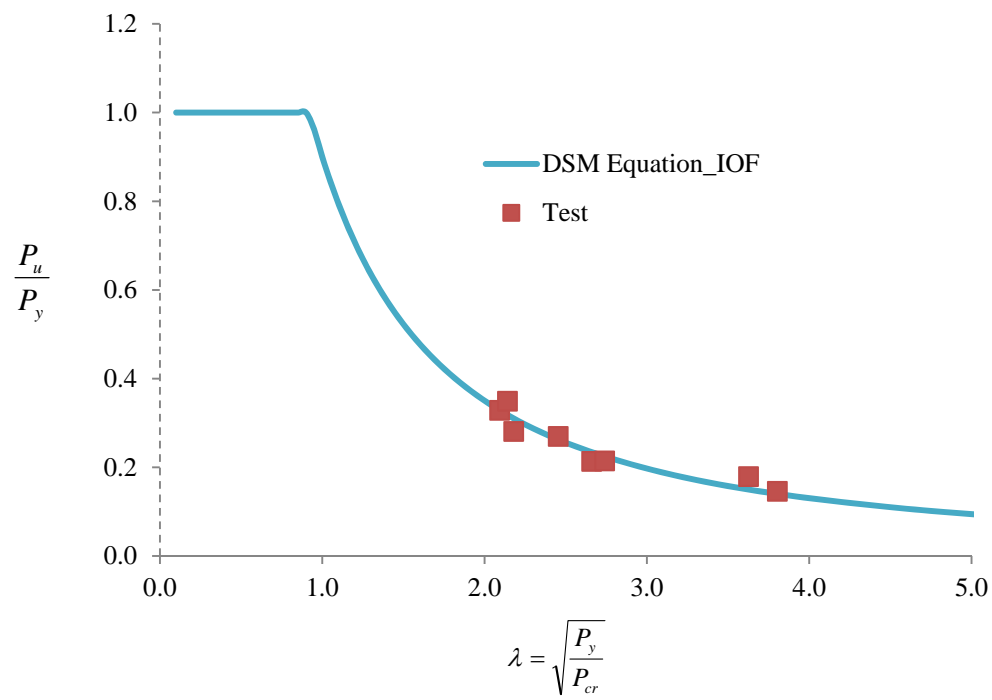


Figure 15: Direct Strength Method based Design Equations – IOF Load case